

L 15478-63

EPF(c)/EWT(m)/BDS

AFFTC/ASD/APGC

Pr-4

RM/BW/WW/MN

ACCESSION NR: AP3005459

S/0204/63/003/004/0615/0619

69

AUTHORS: Spitsyn, Vikt. I.; Ryabchikova, G. G.; Polak, L. S.;
Glazunov, P. Ya.; Yakubovich, A. A.

67

TITLE: Thermo-radiation cracking of propane

SOURCE: Neftekhimiya, v. 3, no. 4, 1963, 615-619

TOPIC TAGS: propane cracking, thermo-radiation cracking, propane, thermal cracking, ionized irradiation

ABSTRACT: Authors studied thermo-radiation cracking of propane, which is a much lighter hydrocarbon and which is used as an industrial raw material. The experiments were conducted at temperatures between 500 and 700C. Propane gives a fairly good conversion and a comparatively simple composition of gaseous products when an intensive radiation dose is applied during the thermal-radiation process, as well as during thermal cracking. The results of thermo-radiation cracking of propane and their comparison to thermal cracking under the same conditions are presented. The yields of H₂, CH₄, C₂H₄ and C₃H₆ as a

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ACCESSION NR: AP3005459

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function of temperature are also given. The activation energy of the propane thermo-radiation cracking process is close to the activation energy of the chain propagation during thermal cracking. The application of ionized irradiation for the initiation of chain reaction permits the carrying-out of the propane cracking process at temperatures which are 100C below ordinary thermal cracking and with good conversion. The experimental and chemical yields under the conducted experimental conditions were approximately 10^3 molecules per 100 ev. Orig. art. has: 5 figures and 3 tables.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR (Institute of physical chemistry, AN SSSR), Institut neftekhimicheskogo sinteza AN SSSR im. A. V. Topchiyeva (Institute of petrochemical synthesis, AN SSSR)

SUBMITTED: 19Dec62

DATE ACQ: 06Sep63

ENCL: 00

SUB CODE: CH

NO REF SOV: 004

OTHER: 002

Card 2/2

S/186/63/005/001/008/013
E075/E436

AUTHORS: D'yachkova, R.A., Spitsyn, Vikt. I.

TITLE: Concentration of protoactinium in materials with a high content of silicic acid

PERIODICAL: Radiokhimiya, v.5, no.1, 1963, 106-110

TEXT: The coprecipitation of Pa with fluorides, the cations of which do not form difficultly soluble fluorosilicates, was studied to establish the possibility of separation of Pa in the form of fluoride complex from fluorosilicic acid. The effective carriers of Pa in the solutions are CaF_2 , SrF_2 and PbF_2 . When these precipitate in the amount of 1.5 to 2 mg/ml, 95 to 99% of Pa coprecipitates. However, the presence of fluorosilicic acid lowers the degree of the coprecipitation. The acid can be precipitated in the form of fluoro-silicates, the adsorption of Pa on them increasing in the order Na_2SiF_6 , K_2SiF_6 , BaSiF_6 . For the separation of 100 to 200 g/litre of the latter two fluorosilicates, the losses of Pa are less than 8 to 12% and can be reduced to 4 to 7% by washing the precipitate with HF. Thus large quantities of fluorosilicic acid can be separated from solutions containing

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Concentration of protoactinium ...

S/186/63/005/001/008/013
EO75/E436

Pa by adding NaNO_3 or KNO_3 , which leads to precipitation of the respective fluorosilicates. There are 2 figures and 3 tables.

SUBMITTED: November 25, 1961

Card 2/2

11 2221

45460
S/078/63/008/003/009/020
B117/B186

AUTHORS: Starostin, V. V., Spitsyn, Vikt. I., Silina, G. F.

TITLE: Complexes between beryllium and ethylene diamine
tetraacetic acid

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 8, no. 3, 1963, 660-662

TEXT: The solubility of beryllium hydroxide in the presence of the ammonium salt of EDTA, H_4Y , was studied at $20^\circ C$ for different pH values and complexon concentrations. The solubility was found to depend linearly on EDTA concentration for all pH values investigated. This was explained in terms of the formation of the beryllium complex BeY^{2-} (pH 7-7.5) and the beryllium hydroxycomplex $BeOHY^{3-}$ (pH > 7.5). The Be concentration decreased with increasing pH due to destruction of complexes and precipitation of $Be(OH)_2$. The instability constants of the complexes were calculated from experimental data: at $20^\circ C$ and $\mu \approx 0.3$, $pK_{BeY^{2-}} = 10.2$, and $pK_{BeOHY^{3-}} = 5.4$. The beryllium complex has

Card 1/2

Complexes between beryllium and ...

S/078/63/008/003/009/020
B117/B186

properties similar to those of the calcium complex, but is more stable than most group IIA complexes and the magnesium complex. On the other hand, the yield of beryllium complex at $\text{pH} > 7$ is smaller than that of alkaline-earth metal complexes under the same conditions. This is due to the low solubility of $\text{Be}(\text{OH})_2$. There are 1 figure and 2 tables. X

SUBMITTED: May 11, 1962

Card 2/2

SPITSYN, Vikt.I.; KANEVSKIY, Ye.A.; NESMEYANOVA, G.M.

Reply to the letter by O.A.Songina, Z.B.Rozhdestvenskaia on the article by
Vikt.Spitsyn, G.M.Nesmeianova, E.A.Kanevskii. Zhur.neorg.khim. no.3:782
Mr '63. (MIRA 164)

(Uranium oxides) (Solution (Chemistry)) (Songina, O.A.)
(Rozhdestvenskaia, Z.B.)

KOMISSAROVA, L.N.; PUSHKINA, G.Ya.; SPITSYN, Vikt. I.

Preparation and ~~some~~ properties of scandium nitrates. Zhur.
neorg. khim. 8 no.6:1384-1394 Je '63. (MIRA 16:6)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova,
kafedra neorganicheskoy khimii.
(Scandium nitrate)

E 11051-63

EAT(m)/BDS--AFFTC/ASD--DM

ACCESSION NR: AP3001183

S/0089/63/014/005/0491/0493 ⁵²

AUTHOR: Gromov, V. V.; Spitsyn, V. I.

TITLE: Study of sorption properties of silica gel irradiated by neutrons /9

SOURCE: Atomnaya energiya, v. 14, no. 5, 1963, 491-493

TOPIC TAGS: sorption after nuclear radiation, nuclear reactor, calcium ions, silica gel sorption

ABSTRACT: It has been shown in a number of papers, both by these authors as well as by others, that, among other effects, the irradiation of a surface of a solid results in a change of sorption. In particular, the sorption by silica gel irradiated mainly by Gamma rays were studied in recent papers. Both an increase and a decrease of sorption were observed. In the present paper, the change of sorption of silica gel in an aqueous medium was studied after irradiation by both neutrons and Gamma rays in a nuclear reactor. Pure, coarse silica gel was irradiated by the flux of thermal neutrons and gamma rays. The sorption of both calcium ions and of methylene blue was measured. It was found that sorption is lowered after radiation, the more so the longer the irradiation time. The authors attribute this to a partially irreversible dehydration of silica gel. Orig. art. has: 2 figures.

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I. 11051-63
ACCESSION NR: AP3001183

0

ASSOCIATION: none

SUBMITTED: 22Jun62

DATE ACQD: 21Jun63

ENCL: 00

SUB CODE: 00

NO REF SOV: 010

OTHER: 003

kes /CA
Card 2/2

KULIKOVSKIY, A.I.; LAVICH, I.A.; BOLINA, E.A.; SPIGGIN, V.I.

Magnetic susceptibility of some azomethines. Vest.Mosk.un.
Ser.2:Khim. 18 no.6:32-33 N-D '63. (MIRA 17:4)

1. Kafedra neorganicheskoy khimii Moskovskogo universiteta.

SPITSYN, V.I.; GLAZUNOV, M.P.; KODOCHIGOV, P.N.; IONOV, V.P.

Determination of sodium in metallic tungsten by the radioactivation method. Zhur.anal.khim. 18 no.10:1272-1273 0 '63. (MIRA 16:12)

1. Institute of Physical Chemistry, Academy of Sciences, U.S.S.R., Moscow.

SPITSYN, V. I., akademik

Some new problems in radiochemistry. Vest. AN SSSR 33 no. 13
11-15 Ja '63. (MIRA 16:1)

(Radiochemistry)

SPITBYN, V.I., akademik

Decisions of the December Plenum of the Central Committee
of the CPSU as an urgent program for Soviet chemists. Zhur.
fiz. Khim. 38 no.2:249-251 P '64. (MIRA 17:8)

KABANOV, V.Ya.; SPITSYN, Vikt.I., akademik

Mechanism underlying the formation of macromolecular tungstates
studied by infrared spectroscopy. Dokl. AN SSSR 148 no.1:109-
112 Ja '63. (MIRA 16:2)

1. Institut fizicheskoy khimii AN SSSR i Moskovskiy gosudarst-
vennyy universitet im. M.V. Lomonosova.
(Tungstates—Spectra)

05174

S/020/63/148/003/028/037
B117/B186

5400
24.7300
AUTHORS:

Mikhaylenko, I. Ye., Spitsyn, Vikt. I., Academician

TITLE:

Effect of the radioactive radiation of $\text{Na}_2^{x}\text{WO}_4$ and $\text{Na}_2^{x}\text{SO}_4$
on the phase transitions of these compounds

PERIODICAL:

Akademiya nauk SSSR. Doklady, v. 148, no. 3, 1963, 613-616

TEXT: The effect of the radioactive radiation of $\text{Na}_2^{x}\text{WO}_4$ and $\text{Na}_2^{x}\text{SO}_4$ on their melting points and on the temperature of their phase transitions was investigated. Melting points and temperatures of polymorphous transformations of the $\text{Na}_2^{x}\text{WO}_4$ and $\text{Na}_2^{x}\text{SO}_4$ used, which were twice crystallized from water and annealed at 100 and 800°C respectively, agreed with published data. The preparations were treated in a nuclear reactor with slow neutrons ($8 \cdot 10^{12}$ n/cm²·sec) and γ -rays ($4 \cdot 10^7$ r/hr). Thermograms of irradiated and nonirradiated preparations were recorded with an accuracy of $\pm 0.25^\circ$. Powdery preparations were investigated first and then the products solidified from their melts. It was established

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Effect of the radioactive ...

S/020/63/148/003/028/037
B117/B186

that for these preparations irradiation in the reactor does not cause a thermographically determinable change of their melting points or phase transition temperatures. A much stronger effect on the phase transitions is due to the radioactive radiation of the substances investigated. As compared with nonirradiated specimens the radioactive preparations had lower melting points and phase transition temperatures. These temperature reductions were found to be caused neither by the formation of radio-chemical admixture nor by decomposition of the isotopes forming in the reactor, but to depend on irradiation time, holding time and specific radioactivity. For $\text{Na}_2^{22}\text{WO}_4$, the temperature reduction of the polymorphous transformations could be observed only at relatively high specific radioactivity ($\sim 25 \text{ mCu/g}$), for $\text{Na}_2^{22}\text{SO}_4$, however, already at a low one ($0.2\text{-}0.4 \text{ mCu/g}$). Reduction of the phase transition temperature is obviously connected with the increased free energy of the radioactive substance, owing to continuous emission. By the emission of β -particles, additional electric fields are formed in these substances which excite the electrons in the atoms. Tentative experiments showed a more

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Effect of the radioactive ...

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B117/B186

complicated e.p.r. spectrum for Na_2WO_4^x than for nonradioactive preparations. The causes of the effect of irradiation and holding time on the phase transition temperature is being investigated. There are 1 figure and 2 tables.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR
(Institute of Physical Chemistry of the Academy of
Sciences USSR)

SUBMITTED: October 16, 1962

Card 3/3

S/020/63/148/004/022/025
B144/B101

AUTHORS: Zimakov, I. Ye., Dobrosel'skaya, N. P., Spitsyn, Vikt. I.,
Academician

TITLE: Effect of the radioactivity of molybdenum trioxide on the
change of its specific surface

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 4, 1963,
884-885

TEXT: The specific surface was studied in MoO_3 samples containing
different quantities of Mo^{99} ($T_{1/2} = 68.3$ hr, $E(\beta)_{\text{max}} = 1.23$ Mev). A
mixture of radioactive and non-radioactive MoO_3 was converted by NH_4OH
to ammonium molybdate. The solution was evaporated and the residue
calcined with addition of HNO_3 to prevent reduction of sexivalent Mo by
 NH_3 . The MoO_3 recovered was mixed with small quantities of Nb_2O_5 and
 ZrO_2 and sublimated at 850°C . The surfaces were measured in samples of

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S/020/63/148/004/022/025

B144/B101

Effect of the radioactivity of ...

0.5 - 0.25 mm granulation. The external specific surface (without blind pores) was measured by filtering rarefied air through the sample and determining the resistance. At radioactivities up to ≈ 10 mcu/g, these surfaces decreased slightly, whereas with higher mcu values they increased. The total surface was determined by the BET method with adsorption of krypton (area occupied by the Kr molecule: 19.5 \AA^2). Additions of radioactive MoO_3 up to 10 mcu reduced the total specific surface

(maximum 30%), while higher additions increased it. The absolute values obtained by the two methods were rather similar, which indicates only a small number of blind pores. Based on a previous study (DAN, 139, 654 (1961)), the reduction of the specific surface with low radioactivities is attributed to the reduction of the evaporation rate. Higher radioactivity entails higher evaporation rates and formation of dendrites owing to the effect of β -particles. There are 2 figures.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry of the Academy of Sciences USSR)

SUBMITTED: November 16, 1962

Card 2/2

YERSHOV, B.G.; PIKAYEV, A.K.; GLAZUNOV, P.Ya.; SPITSYN, Vikt.I., akademik

Electron paramagnetic resonance spectrum of a hydrated electron
in irradiated frozen alkaline solutions. Dokl. AN SSSR 149
no.2:363-366 Mr '63. (MIRA 16:3)

1. Institut fizicheskoy khimii AN SSSR.
(Alkalies--Spectra) (Radiation) (Electrons)

L 10173-63

FCS(f)/EWP(q)/EWT(m)/

BDS--AFFTC/ASD--JD/JG

ACCESSION NR: AP3001405

S/0020/63/150/004/0816/0819

61
60

AUTHOR: Komissarova, L. N.; Spitsy*n, Vikt. I. (Academician); Wang, Ken-shih

TITLE: Lanthanum and neodymium hafnates ²⁷

SOURCE: AN SSSR. Doklady, v. 150, no. ²⁷4, 1963, 816-819

TOPIC TAGS: lanthanum hafnate, neodymium hafnate, lanthanum oxide, neodymium oxide, HfO sub 2, phase diagram, semiconductor, refractories, chemical resistance, chlorinating agent, hydrofluoric acid

ABSTRACT: The synthesis of lanthanum and neodymium hafnates and certain of their physical and chemical properties have been studied. To investigate the conditions of the reaction of HfO sub 2 with lanthanum oxide or neodymium oxide, the required mixtures were prepared 1) by mechanical mixing of the initial oxides and 2) by coprecipitation of the hydroxides. Thermal and x-ray analysis and, in some cases, chemical phase analysis and electrical conductivity measurements were conducted. It was found that a new crystalline phase with a pyrochlore structure is formed -- in case (2) at low temperatures, probably in the course of dehydration,

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L 10173-63

ACCESSION NR: AP3001405

and in case (1) after prolonged heating at 1300C or higher. Study of the phase diagram of the La sub 2 O sub 3 - HfO sub 2 system showed that HfO sub 2 and La sub 2 O sub 3 react to form La sub 2 Hf sub 2 O sub 7, which has a cubic pyrochlore structure and forms solid solutions. Nd sub 2 Hf sub 2 O sub 7 is formed under similar conditions. The structure and certain physical properties of lanthanum and neodymium hafnates are similar to those of the zirconates; the lattice parameters are 10.749 plus or minus 0.001 and 10.627 plus or minus 0.001 kX, respectively, and their density is about 8 g/cm sup 3. The m.p. of these refractories is about 2300--2400C. Study of the electrical resistivity of lanthanum hafnate at 400--800C indicated that its [temperature] coefficient of resistivity is negative, which is characteristic of semiconductors. Lanthanum hafnate was resistant to the chlorinating agent CCl sub 4 at 600--800C for 30 min, and to 36% HCl, 96% H sub 2 SO sub 4, 38% H sub 2 F sub 2, 40% NaOH, or 25% NH sub 4 OH at 65--70C for 3 hr. Orig. art. has: 4 figures and 4 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University) 21

SUBMITTED: 01Feb63

SUB CODE: 00

DATE ACQ: 01Jul63

NO REF SOV: 004

ENCL: 00

OTHER: 004

Card

2/2

PIKAYEV, A.K.; GLAZUNOV, P.Ya.; SPITSYN, Vikt.I., akademik

Mechanism underlying the radiolytic oxidation of bivalent iron in aqueous sulfuric acid solutions containing oxygen when the absorbed dose is high. Dokl. AN SSSR 150 no.5:1077-1080 Je '63. (MIRA 16:8)

1. Institut fizicheskoy khimii AN SSSR.
(Iron compounds) (Radiation) (Oxidation)

BALANDIN, A.A.; SPITSYN, Vikt.I.; DOBROSEL'SKAYA, N.P.; MIKHAYLENKO, I.Ye.

Determination of the specific surface of radioactive catalysts.
Izv.AN SSSR.Ser.khim. no.2:379-382 F '64. (MIRA 17:3)

1. Institut fizicheskoy khimii AN SSSR i Moskovskiy gosudarstvennyy
universitet im. M.V.Lomonosova.

SPITSYN, VIKT.I.; BALANDIN, A.A.; DOBROSEL'SKAYA, N.P.; D'YACHKOVA, R.A.

Catalytic dehydration of cyclohexanol over magnesium sulfate
doped with protactinium-231. Izv. AN SSSR. Ser.khim. no. 3:
564-565 Mr '64. (MIRA 17:4)

1. Institut fizicheskoy khimii AN SSSR i Moskovskiy gosudarstvennyy
universitet im. Lomonosova.

YERSHOV, B.G.; PIKAYEV, A.K.; GLAZUNOV, P.Ya.; SPITSYN, Vikt.I.

Electron paramagnetic resonance spectra of irradiated frozen
aqueous solutions. Izv. AN SSSR. Ser. khim. no.10:1755-
1761 0 '64. (MIRA 17:12)

1. Institut fizicheskoy khimii AN SSSR.

PIROGOVA, G.N.; SPITSYN, Vikt. I.

Effect of different kinds of ionizing radiation on the catalytic
dehydration of n-decyl alcohol and isomerization of α -decene.

Kin. i kat. 5 no. 6:1034-1039 N-D '64.

(MIRA 18:3)

1. Institut fizicheskoy khimii AN SSSR.

1. *Extraction of n-benzoylphenylhydroxylamines of protactinium,*

uranium, and niobium from sulfuric acid solutions. Radiokhimiya
no. 1:104-104 '64. (MIRA 17:6)

ACCESSION NR: AP4020063

S/0186/64/006/001/0130/0132

AUTHOR: Spitsy*n, Vikt. I.; Zimakov, I. Ye.; Dobrosel'skaya, N. P.

TITLE: Effect of radioactive emission S³⁵ and Mo⁹⁹ on the magnitude of the specific surface of molybdenum disulfide

SOURCE: Radiokhimiya, v. 6, no. 1, 1964, 130-132

TOPIC TAGS: molybdenum disulfide, specific surface, BET method, radioactive radiation, tagged molybdenum disulfide, crystal lattice irregularity, crystallization center formation, specific surface change, sulfur 35, molybdenum 99

ABSTRACT: The effect of radioactive radiation imparted by incorporating S³⁵ and Mo⁹⁹ isotopes, on the specific surface of MoS₂ obtained from a melt was investigated. The specific surface was determined by the BET method by low temperature adsorption of krypton. The specific surface of the radioactive materials differs from that of the non-tagged MoS₂ in that it increases with an

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ACCESSION NR: AP4020063

increase in specific radioactivity. With S^{35} the increase is fairly regular and the specific surface is tripled with 30 millicurie/gm. radioactivity from about 8 to 24 m^2/gm . With Mo^{99} the increase is sharper, i.e., almost tripled with 15 millicurie/gm. radiation. (fig. 1). The specific surface of the materials does not change on standing. The difference in specific surface associated with radioactive radiation is apparently caused by the formation of irregularities in the crystal lattice and the creation of additional crystallization centers. Orig. art. has: 2 figures and 1 table

ASSOCIATION: None

SUBMITTED: 05Aug63

DATE ACQ: 31Mar64

ENCL: 01

SUB CODE: GP, NP

NO REF SOV: 007

OTHER: 003

Card 2/3

SPITSYN, Vikt.I.; KOLLI, I.D.; TAM VEN'-SYA

Complex compounds of tri- and pentavalent molybdenum with thiourea.
Zhur.neorg.khim. 9 no.1:99-105 Ja '64. (MIRA 17:2)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova, kafedra
neorganicheskoy khimii.

KOMISSAROVA, L.N.; VAN GEN'-SHI [Wang Ken-shih]; SPITSYN, Vikt.I.;
SIMANOV, Yu.P. [deceased]

System $\text{La}_2\text{O}_3 - \text{HfO}_2$. Zhur. neorg. khim. 9 no.3:693-697
Mr '64. (MIRA 17:3)

1. Moskovskiy gosudarstvennyy universitet im. Lomonosova,
kafedra neorganicheskoy khimii.

SPITSYN, Vikt.I.; AFONSKIY, N.S.; TSIREL'NIKOV, V.I.

Thermal decomposition of rubidium and cesium tri- and tetrachromates.
Zhur.neorg.khim. 9 no.4:845-848 Ap '64. (MIRA 17:4)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova, kafedra
neorganicheskoy khimii.

KABANOV, V.Ya.; SPITSYN, Vikt.I.

Transformations of a paratungstate anion. Zhur. neorg. khim. 9
no.8:1844-1847 Ag '64. (MIRA 17:11)

1. Institut fizicheskoy khimii AN SSSR.

GRIGOR'YEV, A.I.; TAM VEN'-SYA; KOLLI, I.D.; SPITSYN, Vikt. I.

Infrared spectra of complex compounds of tri- and pentavalent
molybdenum with urea and thiourea. Zhur. neorg. khim. 9 no.11:
2585-2589 N '64 (MIRA 18:1)

ACCESSION NR: AP4015561

S/0089/64/016/002/0134/0137

AUTHORS: Spitsy*n, Vikt. I.; D'yachkova, R.A.

TITLE: Pa sup 231 concentration in uranium production waste

SOURCE: Atomnaya energiya, v. 16, no. 2, 1964, 134-137

TOPIC TAGS: protactinium, thorium, irradiated thorium, Pa sup 231, zirconium, cerium, niobium, tantalum, titanium, tetravalent manganese, sorbent, precipitation, amyl acetate, tributyl ester, protactinium salicylate

ABSTRACT: An intensive study of the protactinium chemistry has been largely stimulated by the fact that the Pa^{233} isotope is one of the links in the production of U^{233} from neutron-irradiated thorium. The long-lived natural Pa^{231} isotope produced by the U^{235} disintegration is most suitable for chemical investigation purposes. The equilibrium content of Pa^{231} in uranium minerals is extremely small, and does not exceed several hundredth parts of a gram per ton even in rich ores. This makes the protactinium concentration in certain

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ACCESSION NR: AP4015561

intermediate and waste products of uranium production more valuable than the rest of the uranium ore. The isolation of protactinium from nitric acid solutions included a study of the possible use of substances which had never been used as carriers of that element before, such as ion-exchange resin hypophosphate and certain oxides that are not easily soluble in nitric acid. Protactinium can be absorbed from nitric acid solutions by every tested sorbent. The introduction of extraneous salts into the solution sharply reduces the sorbents' capacity in regard to protactinium with the exception of manganese dioxide. The sorbtion of iron by manganese dioxide is considerably greater than the sorbtion of aluminum and calcium, particularly in low-acidity solutions. Orig. art. has: 1 figure and 7 tables.

ASSOCIATION: None

SUBMITTED: 19Jan63

DATE ACQ: 12Mar64

ENCL: 00

SUB CODE: EL, CH

NO REF SOV: 004

OTHER: 005

Card 2/2

SPITSYN, Vikt.I.

Indian scientific atomic center at Trombay. Atom.energ. 16
no. 4:384-385 Ap '64. (MIRA 17:5)

L 15636-65 EWT(m)/EPF(n)-2/EWA(d)/EWP(t)/EWP(b) Pu-4 ASD-3/AFFTC/ESD-3/SSD/
IJP(c) ES/JD/WW/JG/WB/DM

ACCESSION NR: A4043987

S/0089/64/017/002/0119/0123

AUTHOR: Spitsy*n, Vikt. I.; Nesmeyanova, G. M.; Vikulov, A. I. B

TITLE: Some features of the uranium oxidation process by the ions of trivalent iron 27 18

SOURCE: Atomnaya energiya, v. 17, no. 2, 1964, 119-123

TOPIC TAGS: uranium oxidation, trivalent iron ion, sulfuric acid, perchloric acid

ABSTRACT: The authors investigated the oxidation of UO_2 by the Fe^{3+} ions in neutral, sulphuric-perchloric acid solutions. One of the possible mechanisms of this oxidation is discussed and factors are described which affect the oxidation reaction. The effect of SO_4^{2-} and HSO_4^- ions on UO_2 - oxidation in perchloric acid by the Fe^{3+} ions is determined. The authors conclude that the oxidation process proceeds easily in a "neutral" solution of salts of sulfuric and perchloric acids, with the transfer of UO_2^{2+} into the solution. It depends only little on temperature in the 20 to 60 C range. It is assumed that the process occurs in the diffusion range. Orig. art. has: 4 figures and 4 tables.

Card 1/2

L 15636-65

ACCESSION NR: AP4043987

ASSOCIATION: None

SUBMITTED: 28Jan63

ENCL: 00

SUB CODE: GC, NP

NO REF SOV: 005

OTHER: 006

Card 2/2

MIKHAYEV, N.B.; SPITSYN, Viktor I.; KHERMANN, A.

Obtaining an equilibrium between the crystalline phase and solution
by means of the electrochemical method. Vest. Mosk. un. Ser. 2:
Khim. 19 no.6:29-31 N.D '64. (MIRA 18:3)

1. Kafedra neorganicheskoy khimii Moskovskogo universiteta.

SPITSYN, V.I., akademik; DROBYSHEV, M.A., kand.ekonom.nauk

Our contacts with Indian scientists. Vest. AN SSSR 34 no.3:
102-104 Mr '64. (MIRA 17:4)

SPITSYN, V.I., akademik; KUZINA, A.F., kand.khim.nauk

Technetium; the first artificial element. Priroda 53 no.3:59-63 '64.
(MIRA 17:4)

1. Institut fizicheskoy khimii AN SSSR, Moskva.

SPITSYN, V.I., akademik; PIRAYEVA, V.I.; MIKHAILENKO, I.Ye.

Catalytic properties of radioactive tungsten disulfide in the
dehydration of n-decyl alcohol. Dokl. AN SSSR 149 no.5:1102-1105
D '64 (MIRA 18:1)

1. Institut fizicheskoy khimii AN SSSR.

YERSHOV, B.G.; PIKAYEV, A.K.; GLAZUNOV, P.Ya.; SPITSYN, Vikt. I.,
akademik

Electron paramagnetic resonance method used for proving
the participation of the trapped electron in the radiochemical
reactions taking place in frozen aqueous solutions. Dokl. AN
SSSR 154 no.4:899-902 F '64. (MIRA 17:3)

1. Institut fizicheskoy khimii AN SSSR.

CHUVAYEV, V.F.; KABANOV, V.Ya.; SPITSYN, Vkt.I., akademik

Study of the state of water in phosphomolybdic acid by means
of nuclear magnetic resonance. Dokl. AN SSSR 155 no. 4:908-911
Ap '64. (MIRA 17:5)

1. Institut fizicheskoy khimii AN SSSR.

SPITSYN, Viktor I., akademik; GROMOV, V. V.

Effect of electrolytes on the absorption of dyes by
radioactive precipitates of BaSO_4 . Dokl. AN SSSR 156 no. 2:
427-429 My '64. (MIRA 17:7)

1. Institut fizicheskoy khimii AN SSSR.

SPITSYN, Vikt.I., akademik; D'YACHKOVA, R.A.; KHEBNIKOV, V.P.

State of protactinium in nitric acid solutions. Dokl. AN
SSSR 157 no.1:135-138 J1 '64 (MIRA 17:8)

1. Institut fizicheskoy khimii AN SSSR.

ACCESSION NR: AP4042023

S/0020/64/157/001/0147/0149

AUTHOR: By*strov, L. N.; Ivanov, L. I.; Spitsy*n, V. I.
(Academician).

TITLE: Effect of γ -irradiation on the rate of aging of beryllium copper

SOURCE: AN SSSR. Doklady*, v. 157, no. 1, 1964, 147-149

TOPIC TAGS: gamma irradiation, beryllium copper, beryllium copper aging, gamma irradiation effect

ABSTRACT: The effect of γ -irradiation on the aging of beryllium copper (2.5% Be) annealed at 800C and water quenched was investigated by measuring the electric resistance at -196C (to eliminate the influence of the phonon component) of a wire 2 mm in diameter. The initial electric resistance of the wire at -196C was about 10^{-2} ohms. One of the two specimens used was subjected to repeated irradiation from radioactive cobalt (dose, 490 r/sec); the electric resistance (of both specimens) was measured after each irradiation. The magnitude $\Delta(R_{\text{irrad}}/R_{\text{non-irrad}})$ served as the criterion of the irradi-

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ACCESSION NR: AP4042023

ation effect. After a total irradiation dose of 125.10^7 r was reached, both specimens were annealed at 120C for about 500 hr, with periodical measurements of resistance. The results of the experiments are presented in a graph (see Fig. 1 of the Enclosure). The behavior of the irradiated specimen is explained as follows: the γ -irradiation caused formation of numerous crystallization centers of a new phase, but their growth was retarded by low temperature (room temperature). At 120C, however, new crystals begin to grow from these centers, and the resistance of the irradiated specimen increases more rapidly than that of non-irradiated specimens. As soon as the crystallization centers are consumed, the aging rate of irradiated specimen begins to decrease, and the relative electric resistance also decreases somewhat. Orig. art. has: 1 figure.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy)

SUBMITTED: 05Jul63

ATD PRESS: 3077

ENCL: 01

SUB CODE: MM, NP

NO REF SOV: 002

OTHER: 002

Card 2/3

ACCESSION NR: AP4042023

ENCLOSURE: 01

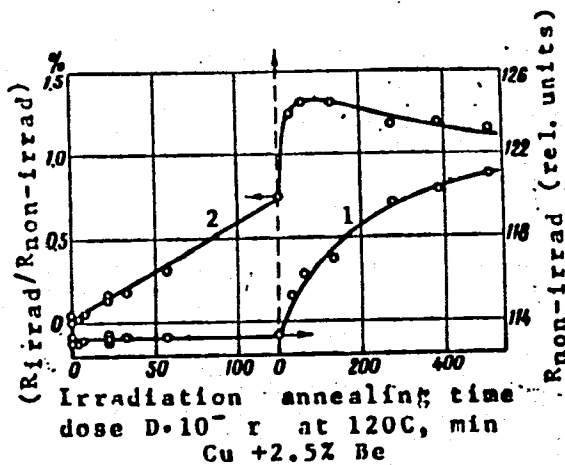


Fig. 1. Dependence of electrical resistance of non-irradiated specimen on annealing time (1) and dependence of electrical resistance of irradiated specimen on radiation dose and annealing time (2)

Card 3/3

L 40733-65 EWT(m)/FPF(c)/EPF(n)-2/EWP(j)/T/EWP(t)/EWP(h) Pc-4/Pr-4/Pu-4

IJP(c) JD/JG/RM

ACCESSION NR: AP5012395

UR/0020/64/157/005/1167/1170

34
35
0
1

AUTHOR: Torchenkova, Ye. A.; Stepanova, G. G.; Spitsyn, Vikt. I. (Academician)

TITLE: Interaction of the rare earths with cerium-molybdenum heteropoly-compounds

SOURCE: AN SSSR. Koklady, v. 157, no. 5, 1964, 1167-1170

TOPIC TAGS: rare earth metal, cerium compound, molybdenum compound, physical chemistry

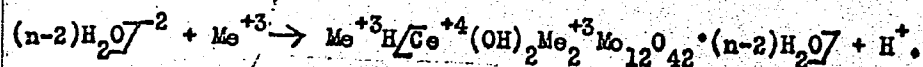
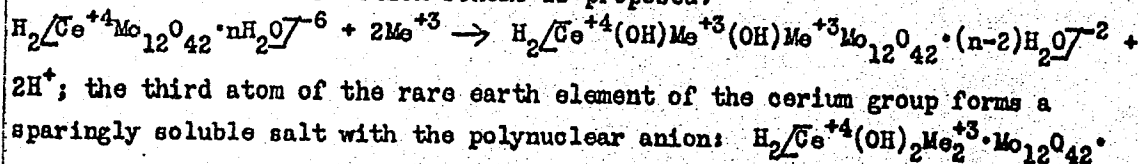
Abstract: The addition of cerimolybdic acid to solutions of trivalent rare earths revealed different behaviors of the cerium and yttrium groups: in the case of salts of lanthanum or trivalent elements of the cerium group, a yellow precipitate, soluble in an excess of the heteropoly-acid, was formed; salts of elements of the yttrium group gave no precipitates with the freshly prepared heteropoly-acid at any ratio of the reagents, but a definite weakening of the color intensity of cerimolybdic acid was visually observed. The composition of the salt precipitates was independent of the ratio of the initial reagents: $1.5 \text{ Mo}_2\text{O}_3 \cdot \text{CeO}_2 \cdot 12 \text{ MoO}_3 \cdot n\text{H}_2\text{O}$. The interaction of cerimolybdic acid with the elements of the cerium and yttrium groups was studied using a number of physical-chemical methods: amperometric titration on a dropping mercury electrode; study of the absorption spectrum in the

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L 40733-65

ACCESSION NR: AP5012395

region from 250 to 350 millimicrons. The formation of the compound at the ratio $Me^{+3}:CMA = 2:1$ (CMA: cerimolybdic acid) was revealed by investigations of the optical density at 350 millimicrons and by the pH variation in the system ammonium cerimolybdate - Y - $(NO_3)_3 - H_2O$. The method of electro-migration revealed that Ce^{+3} in a mixture with ammonium cerimolybdate moves toward the anode. A reaction scheme is proposed:



Orig. art. has 1 table and 4 graphs.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences, SSSR)

SUBMITTED: 14Apr64

NO REF SOV: 004

Card 2/2

ENCL: 00

OTHER: 004

SUB CODE: MM, GC

JPRS

L 55917-65 EWT(1)/EPF(c)/EEC(t) PI-4 IJP(c) WW/GG

ACCESSION NR: AP5018336

UR/0020/64/159/001/0178/0181

AUTHOR: Spitsyn, Vikt. I. (Academician); Gromov, V. V.; Karaseva, L. G.

TITLE: Investigation of the electron paramagnetic resonance spectra of radioactive and irradiate samples of calcium, strontium, and barium sulfates

SOURCE: AN SSSR. Doklady, v. 159, no. 1, 1964, 178-181

TOPIC TAGS: electron paramagnetic resonance, inorganic salt, crystal structure, sulfate

ABSTRACT: The method of electron paramagnetic resonance was used to study the transformation that occur in the crystal lattice of sulfides of the alkaline earth elements under the influence of the beta radiation of S^{35} , introduced into these preparations. The irradiation of nonradioactive samples of the same salts on a Co^{60} gamma setup was conducted for comparison. The comparison of the electron paramagnetic resonance spectra of radioactive and irradiated samples of calcium, strontium, and barium sulfates showed that the nature of certain paramagnetic centers (A,B) is the same in both cases. In

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L 55917-65

ACCESSION NR: AP5018336

contrast to the radioactive preparations, the spectra of the gamma-irradiated sulfates consist of a large number of paramagnetic centers differing in character, since the absorbed dose was twice as high as in the radioactive preparations. A comparison of the yields of paramagnetic centers of the three substances showed that $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ possesses the greatest radiation stability, and SrCO_4 the least. This finding correlates with the corresponding pattern found for the heats of formation of these compounds: $\text{CaSO}_4 \cdot \text{H}_2\text{O} > \text{BaSO}_4 > \text{SrSO}_4$.
Orig. art. has: 4 figures, 1 table.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences SSSR)

SUBMITTED: 26May64

ENCL: 00

SUB CODE: NP, IC

NR REF SOV: 008

OTHER: 005

JPRS

Am
Card 2/2

SPITSYN, Vikt.I., akademik; LAVUT, E.G.

Isotopic exchange between gaseous oxygen and some uranium
compounds. Dokl. AN SSSR 159 no.3:626-629 N '64
(MIRA 18:1)

1. Moskovskiy gosudarstvennyy universitet.

L 37691-65 EPR/EWA(c)/EWT(m)/EWP(b)/T/EWA(d)/EWP(t) Ps-4/PeB DIAAP/IJP(c)
MJW/JD

ACCESSION NR: AP5000917

S/0020/64/159/004/0865/0868

AUTHOR: Spitsyn, V. I. (Academician); Korolev, A. Ya.; Kuleshov, I. M.;
Vinogradova, L. M.

TITLE: Investigation of the aluminum polishing process by the radioactive tracer method

SOURCE: AN SSSR. Doklady, v. 159, no. 4, 1964, 865-868

TOPIC TAGS: aluminum polishing, mechanism, kinetics, stearic acid, stearic acid chemisorption, Duralumin

ABSTRACT: The action of stearic acid in aluminum polishing was studied by polishing Duralumin D16-ATV with a paste of chromic oxide and stearic acid in which the carboxyl group was tagged with C-14. Extraction of the polished metal with benzene for 1 hour reduced the radioactivity of the surface to a level which then remained essentially constant, even after prolonged extraction with other organic solvents. Boiling in water rapidly reduced the radioactivity to a constant value which indicated 28% of the stearic acid did not undergo hydrolysis. Calculations showed that one stearic acid molecule was chemisorbed for 4 surface

Card 1/2

L 37691-65

ACCESSION NR: AP5000917

aluminum atoms. However, the bonding was not uniform over the metal surface, but was primarily at the points of lattice defects and dislocations in the metal. An amorphous film on metallic aluminum remained after the benzene extraction, but after hydrolysis, the -modification of $Al_2O_3 \cdot H_2O$ appeared through the amorphous film. The hydrophobic film formed by grafting of the acyl radicals to the aluminum surface protected the surface from oxidation and increased the corrosion resistance and mechanical strength of the polished metal in comparison to the unpolished, and facilitated formation of fresh aluminum surface by the dispersing action of the abrasive during the polishing process. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences, SSSR)

SUBMITTED: 13Jul64

ENCL: 00

SUB CODE: MM, GC

NR REF SOV: 004

OTHER: 003

Card 2/2

PIKAYEV, Sergey Konstantinovich; SPITSYN, V.I., akademik, otv.
red.; BUGAYENKO, L.T., red.

[pulse radiolysis of water and aqueous solutions] Impul's-
nyi radioliz vody i vodnykh rastvorov. Moskva, Nauka,
1965. 259 p. (MIRA 18:1)

L 40795-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG

ACCESSION NR: AP5006409

S/0062/65/000/001/0003/0011

AUTHOR: Komissarova, L. N.; Wang Ken-shih; Spitsyn, V. I.

TITLE: The interaction of hafnium hydroxide with the hydroxides of yttrium,
lanthanum, neodymium, and ytterbium

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 1, 1965, 3-11

TOPIC TAGS: hafnium, hafnium compound, hydroxide, yttrium, yttrium compound,
lanthanum, lanthanum compound, neodymium, neodymium compound, ytterbium, ytterbium
compound

ABSTRACT: The interaction of hafnium hydroxide with the hydroxides of yttrium, lanthanum, neodymium, and ytterbium in a co-precipitated state at a temperature of 100-1000 degrees was studied by differential-thermal, phase x-ray, and chemical analysis methods. The hydroxides were precipitated from hydrochloric acid solutions with ammonia at pH 9 and at a temperature of 30-40 degrees. In the co-precipitated state the corresponding hydroxides react at a temperature below 600 degrees with the formation of chemical compounds--pyrohafnates of lanthanum and neodymium, or of solid solutions, with the oxides of yttrium and ytterbium. In a mechanical mixture of the hydroxides the reactions take place at high temperatures (> 1000 degrees).

Card 1/2

L 40795-65

ACCESSION NR: AP5006409

The reactivity of oxides of the rare earth elements with HfO_2 drops in the order $\text{La}_2\text{O}_3 \rightarrow \text{Nd}_2\text{O}_3 \rightarrow \text{Y}_2\text{O}_3 \rightarrow \text{Yb}_2\text{O}_3$. The temperature at the beginning of crystallization and also the magnitude of the parameter of the crystalline lattice of the new phases being formed decreases with a reduction in the size of the ions of the rare earth elements. Orig. art. has: 7 figures, 3 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 20Feb63

ENCL: 00

SUB CODE: GC, IC

NO REF SOV: 002

OTHER: 007

Card 2/2

L 58903-65 EWP(e)/EWT(m)/EPF(c)/EWP(i)/EPF(n)-2/EWP(t)/EWP(b) Pr-4/pu-4
TJP(c) JD/GG/WH

ACCESSION NR: AP5017057

UR/0289/65/000/001/0040/0047
546.26-162:541.15

42
38
B

AUTHOR: Spitsyn, V.I.; Pirogova, G.N.

TITLE: Effect of radiation on Yakutia diamonds 15

SOURCE: AN SSSR. Sibirskoye otdeleniye. Izvestiya. Seriya khimicheskikh nauk, no. 1, 1965, 40-47

TOPIC TAGS: diamond, ESR spectrum, paramagnetic resonance, neutron bombardment, electron bombardment, Gamma irradiation

ABSTRACT: The optical properties, absorption and electron spin resonance spectra, and density of Yakutia diamonds exposed to slow and mixed neutrons, Co^{60} gamma rays, X-rays, and accelerated electrons are reported. Absorption in the ultraviolet and visible decreased after irradiation; no changes were observed in the infrared. Heating of the irradiated diamonds from 200 to 1100C caused a gradual decrease in absorption, but complete annealing of the defects induced by the irradiation did not occur. Slow neutrons (integrated flux of $2.5-17.5 \times 10^{17} \text{ n/cm}^2$) colored the diamonds green, while in the presence of 1% fast neutrons in the flux, the diamonds turned black. When exposed to fast electrons (dose of $0.5-6.0 \times 10^{24} \text{ eV/cm}^2$), the diamonds acquired a blue color, whereas Co^{60} gamma rays (dose of $9.3 \times 10^6 \text{ r}$) made them bluish-green. The blue and green color of the diamonds was stable at room temperature and on heating to 400C. Irradiation of

L 58903-65

ACCESSION NR: AP5017057

4
diamonds caused the formation of paramagnetic centers. The character of the ESR spectra depended on the kind and dose of radiation. Prolonged storage at room temperature and heating caused the ESR signals to disappear. The density of diamonds remained unchanged after irradiation with slow neutrons (flux of 3×10^{18} n/cm²), fast electrons (dose of 6×10^{24} eV/cm²), or Co⁶⁰ gamma rays (dose of 2×10^9 r). "The authors thank I. S. Rozhkov, chairman of the Presidium of the Yakutsky filial SO AN SSSR (Yakutia Branch of the SO AN SSSR) and corresponding member of the AN SSSR, for providing the samples of Yakutia diamonds for this work. The β and γ spectra were recorded by P. N. Kodochigov and M. P. Glazunov." Orig. art. has: 4 figures and 3 tables.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR, Moscow (Institute of Physical Chemistry)

SUBMITTED: 15May64

ENCL: 00

SUB CODE: MT, NP

NO REF SOV: 002

OTHER: 008

Card

2/2 *slp*

L 48981-65 EWG(j)/EWT(m)/EPF(c)/EPF(n)-2/EWP(j)/EWA(h)/EWA(1) Fc-4/Pr-4/Peb/
Pu-4 RPL GG/RM

ACCESSION NR: AP5009656

UR/0062/65/000/003/0401/0408

AUTHOR: Pikayev, A. K.; Glazunov, P. Ya.; Spitsyn, Vikt. I.

TITLE: Approximate values of the rate constants of radiation-induced reactions of hydrogen atoms and hydroxyl radicals in aqueous solutions

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 3, 1965, 401-408

TOPIC TAGS: radiochemical reaction, rate constant, atomic hydrogen, hydroxyl radical, electron bombardment, ferrous ion oxidation, radiolytic oxidation

ABSTRACT: The article describes a new method of evaluating the absolute rate constants of radiation-induced reactions involving H and OH radicals, based on the use of two independent methods of kinetic treatment of experimental data obtained by studying the radiolysis of aqueous sulfuric acid solutions of ferrous sulfate containing oxygen and subjected to pulses of electron radiation. The mechanism of radiolytic oxidation of Fe^{2+} ions at high rates of the absorbed dose was examined. The decrease in the yield of Fe^{3+} is attributed to the competition of the reactions $\text{H} + \text{OH}$, $\text{Fe}^{2+} + \text{OH}$ and $\text{H} + \text{O}_2$. Absolute values of the reaction rate constants were determined: $k_{\text{Fe}^{2+}+\text{OH}} = 2.7 \times 10^8$; $k_{\text{H}+\text{O}_2} = 5.3 \times 10^9$

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L 48981-65

ACCESSION NR: AP5009656

and $k_{H+OH} = 4.5 \times 10^{10}$ /mole·sec. On the basis of literature data on the relative constants and absolute values obtained, the rate constants of a series of radiation-induced reactions of H and OH radicals were estimated. Orig. art. has: 3 figures, 5 tables, and 19 formulas.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences, SSSR)

SUBMITTED: 10Apr63

ENCL: 00

SUB CODE: GC, NP

NO REF SOV: 012

OTHER: 024

Card

2/2

YEFER, B. I.; KRYLYA, A. K.; LIZOV, T. Y.; KLEBYN, V. K. I.

Electron paramagnetic resonance spectra of irradiated frozen aqueous solutions. Report No. 2: Aqueous solutions of sodium nitrate. Izv. AN SSSR, Ser. Khim. no. 10:1758-1763, 1965.

(MIRA 16:10)

L. Institut fizicheskoy khimii AN SSSR.

LAVUT, E.G.; SPITSYN, Vikt. I.

Isotope exchange of oxygen with various oxygen-containing uranium compounds. Teoret. i eksper. khim. 1 no.1:106-116 Ja-F '65. (MIRA 18:7)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova, kafedra neorganicheskoy khimii.

L 00622-67 EWT(1)/EWT(m)/T/EWP(t)/ETI IJP(c) GG/JD

ACC NR: AT6020037 (A) SOURCE CODE: UR/2564/65/005/000/0212/0218

AUTHOR: Spitsyn, V. I.; Zimakov, I. Ye.; Dobrosel'skaya, N. P.

52
B+1

ORG: none

TITLE: The influence of radiation on the formation and uniformity of crystals

21

SOURCE: AN SSSR. Institut kristallografii. Rost kristallov, v. 5, 1965, 212-218

TOPIC TAGS: crystal growth, crystal deformation, radiation damage, radiation effect

ABSTRACT: In the last 5 years the Institute of Physical Chemistry, Academy of Sciences SSSR (Institut fizicheskoy khimii Akademii nauk SSSR) gathered numerous data concerning the influence of radioactive radiations of solids on their physico-chemical properties, in particular the production of nonuniform crystals. The present article contains further data collected during the study of radioactive crystalline powders of barium tungstate, elementary sulfur, molybdenum tri- and disulfide, all synthesized by crystallization from solutions and gaseous vapors, and precipitation from alloys. The nonradioactive and radioactive samples with differing specific activity were prepared under strictly identical conditions. The samples were studied by measuring their size and their specific surface, and by taking electron-microscopic pictures. The paper describes in considerable detail the

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L 00622-67

ACC NR: AT6020037

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preparation and analysis of the samples. The results are given in the form of graphs showing the specific surface of crystals as a function of activity and a table summarizing the results of the particle size analysis. Radiation was due to W185, S35, and Mo99 isotopes. The paper concludes with a discussion of the microphotographs. Orig. art. has: 7 figures and 2 tables.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 007/ OTH REF: 000

Card 2/2 pb

СИДЯВ, ВИК. Л.; МИХАЙЛЕНКО, Л.Я.; ПЕТРОВА, С.М.

Catalytic dehydration of some alcohols over radioactive magnesium sulfate. Kin. i kat. 6 no.4:735-736 JI-Ag '65. (MIRA 18:9)

1. Institut fizicheskoy khimii AN SSSR.

L 60399-55 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG

ACCESSION NR: AP5016997

UR/0186/65/007/003/0257/0261

542.61: 546.798: 54-145.4

14
B

AUTHOR: Spitsyn, V. I. ; D'yachkova, R. A. ; Khlebnikov, V. P.

TITLE: Tributyl phosphate extraction of protactinium. Part 1. Nonextractable forms of protactinium

27

SOURCE: Radiokhimiya, v. 7, no. 3, 1965, 257-261

TOPIC TAGS: protactinium, tributyl phosphate, polymeric protactinium, radioisotope extraction

ABSTRACT: The article reports on the kinetics of extraction of protactinium from nitric acid solutions as a function of the "age" and concentration of the Pa solutions, and gives the results of a determination of Pa present in a nonextractable form in HNO₃ solutions. In addition, in order to determine the conditions under which polymeric forms of Pa exist, the distribution ratio was studied as a function of the Pa concentration. It was found that when fresh Pa solutions were used, the equilibrium was established in a few minutes, and the distribution ratios for the extraction and reextraction were the same. In the case of aged solutions, the extraction equilibrium was not reached after 100 hr of stirring because of the presence of nonextractable forms of Pa; up to 45% Pa can be present in such forms even

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L 60399-65

ACCESSION NR: AP5016997

in 6M HNO₃. In extraction from fresh solutions, the distribution ratio is independent of the Pa concentration in the 10⁻⁷-10⁻¹² M range; this indicates the absence of polymerization of Pa both in the aqueous and in the organic phase. It is concluded that in studying the state of Pa by the extraction method, it is desirable to use the distribution ratio obtained from data on the reverse extraction from the organic phase into the aqueous phase. Orig. art. has: 6 figures, 1 table, and 2 formulas.

ASSOCIATION: None

SUBMITTED: 03Apr64

ENCL: 00

SUB CODE: IC

NO REF SOV: 003

OTHER: 006

Card 2/2

L 60400-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG

ACCESSION NR: AP5016998

UR/0186/65/007/003/0262/0265
542.61: 546.796: 54-145.4

14
B

AUTHOR: D'yachkova, R. A. ; Spitsyn, V. I. ; Khlebnikov, V. P.

TITLE: Tributyl phosphate extraction of protactinium. Part. 2. Determination of the solvation number of the extracted protactinium complex

SOURCE: Radiokhimiya, v. 7, no. 3, 1965, 262-265

TOPIC TAGS: protactinium, tributyl phosphate, polymeric protactinium, radioisotope extraction, solvation

ABSTRACT: The distribution ratio of protactinium was studied as a function of the tributyl phosphate (TBP) concentration in extraction from nitric and perchloric acids. The ionic strength of the aqueous phase was kept constant. The initial and equilibrium concentrations of HNO_3 and TBP were calculated by taking into account their interaction, which causes the formation of the complexes $\text{HNO}_3 \cdot \text{TBP}$ and $(\text{HNO}_3)_2 \cdot \text{TBP}$ in the organic phase. The slope of the straight line representing the log of the distribution ratio versus the log of the concentration of free TBP for extraction from 1 to 5 M HNO_3 was found to be 2.13. It is concluded that in the concentration range under consideration, protactinium is

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L 60400-65

ACCESSION NR: AP5016998

extracted with the formation of a disolvate in the organic phase. In the case of extraction from perchloric acid, a whole series of complexes of the type $m\text{HClO}_4 \cdot n\text{TBP}$ are formed whose equilibrium constants (except that of $\text{HClO}_4 \cdot 4\text{TBP}$) are not known, so that the interaction of HClO_4 and TBP could not be accurately determined. It was found that the number of TBP molecules attached to protactinium in extraction from 1-5 M HClO_4 is close to 3. Orig. art. has: 2 figures and 2 tables.

ASSOCIATION: None

SUBMITTED: 03Apr64

ENCL: 00

SUB CODE: IC

NO REF SOV: 006

OTHER: 003

dm
Card 2/2

YATSOV, VIKT. I., LOMONOSOV, M.V.

Reaction of phosphotungstic acid and its trisubstituted sodium salt with caustic soda. Zhur. neorg. khim. 10 no.3:657-661
Mr '65. (MIRA 18:7)

1. Kafedra neorganicheskoy Khimii Moskovskogo gosudarstvennogo universiteta imeni M.V. Lomonosova.

L 61078-65 EPF(c)/EWG(j)/EPA(s)-2/ENT(m)/ENP(b)/ENP(t) IJP(c) JD/JG

ACCESSION NR: A25018256

UR/0078/65/010/007/1756/1757
546.33'668

20
19
B

AUTHOR: Murav'yeva, I. A.; Kovba, L. M.; Martynenko, L. I.; Spitsyn, V. I.

TITLE: Synthesis of sodium ytterbate²¹

SOURCE: Zhurnal neorganicheskoy khimii, v. 10, no. 7, 1965, 1756-1757

TOPIC TAGS: sodium ytterbate, ytterbium oxide²¹, sodium oxide

ABSTRACT: The aim of the study was to investigate the reaction between ytterbium oxide and sodium oxide. Mixtures of the oxides in the proportions Y:Na = 1:2 and 1:3 were treated with nitric acid, the nitrate solutions were dried, and the residue was carefully heated in air until all the nitrogen oxides were driven off, then heated in a furnace for 6 hr. at 850C. When the calcined samples were studied by x-ray phase analysis, the powder patterns revealed new lines which indicated that a reaction had taken place. It was found that the compound belongs to a hexagonal system, is isostructural with sodium α -ferrite and sodium indate, and hence, that its composition is NaYbO₂. The lattice constants for

Card 1/2

L 61078-65

ACCESSION NR: AP5018256

NaYbO₂ are $a = 3.350 \pm 0.01$ A and $c = 16.53 \pm 0.01$ A. Under the same conditions, no reaction was observed between ytterbium oxide and potassium oxide or rubidium oxide. Compounds were also formed by heating yttrium oxide and lanthanum oxide with sodium oxide. Orig. art. has: 1 table.

ASSOCIATION: Kafedra neorganicheskoy khimii, Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Department of Inorganic Chemistry, Moscow State University)

SUBMITTED: 07Dec64

ENCL: 00

SUB CODE: IC

NO REF SOV: 001

OTHER: 002

Card

KC
2/2

BOGATYKH, A.S.; BRILLO, I.I.; SACHCH, I.A.; SHISHIN, Ikt.1.

Magnetic susceptibility of some inner-complex compounds.

Vest. Mosk. un. Ser. 2: Khim. 20 no.1:31-32 Ja-F '65.

(MIRA 18:3)

1. Kafedra neorganicheskoy khimii Moskovskogo universiteta.

KUDRYAVTSEV, A.S.; SAVICH, I.A.; SPITSYN, Vikt.I.

Determination of the constants of acid dissociation (K_k) of Schiff bases. Vest. Mosk. un. Ser. 2: Khim. 20 no.2:47-49 Mr-Apr '65.
(MIRA 18:7)

1. Kafedra neorganicheskoy khimii Moskovskogo universiteta.

SPITSYN, Vikt.I.; GRANOVSKIY, Yu.V.; KOMISSAROVA, L.N.; BORISOVA, A.P.; SAVICH, I.A.

Spectrophotometric study of the process of complex formation by the Fox-Wilson method. Vest. Mosk. un. Ser. 2: Khim. 20 no.2:50-53 Mr-Apr '65.
(MIRA 1877)

1. Kafedra neorganicheskoy khimii Moskovskogo universiteta.

L 32078-65 EWT(m)/EPF(n)-2/EWP(t)/T/EWP(j)/EWP(b) Pc-4/Pu-4 IJP(c) JD/JG/RM

ACCESSION NR: AP5006087

S/0073/65/031/002/0158/0160

AUTHOR: D'yachkova, R. A.; Spitsyn, Vikt., L.

TITLE: The relative stability of protactinium, niobium and tantalum fluoride complexes /

SOURCE: ²⁷Ukrainskiy khimicheskiy zhurnal, v. 31, no. 2, 1965, 158-160

TOPIC TAGS: protactinium fluoride, niobium fluoride, tantalum fluoride, complex fluoride stability

ABSTRACT: Little work has been done on the quantitative determination of the stability of the complex fluorides. In the present study, the metal-indicator method was used, employing the ferric thiocyanate system to determine the changes in equilibrium of the system $Fe^{+3} + SCN^- + F^- + Me^{+n}$ (where Me^{+n} is the metal cation), and measuring the resultant shift in optical density with a photoelectric colorimeter. The basic indicator was a system with an overall fluoride concentration of 2×10^{-2} M and an optical density of 0.53, about 1/2 the density of the system without fluoride ions, thus affording sufficient reliability of the measurements. The elements to be studied were introduced in the form of K_2NbF_7 , K_2TaF_7 and K_2PaF_7 at an ion concentration of 2×10^{-3} moles. The stronger the fluorine-metal complex, the greater the changes appearing in the indicator

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ACCESSION NR: AP5006087

system; in the strongest case, the optical density increased from 0.53 to 0.79. The strength of the metal-fluorine bond was found to increase in the order $Ta < Nb < Pa$. It should be noted that these elements tend to hydrolyze in aqueous solution and that the stability of the complexes is determined by the relative energy of the bonds of the metal ions with 2 competing components, the oxygen ion and the fluoride ion. Orig. art. has: 1 table and 1 figure.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR (Physical chemistry institute, AN SSSR)

SUBMITTED: 25Mar64

ENCL: 00

SUB CODE: IC, SS

NO REF SOV: 004

OTHER: 003

Card 2/2

SPITSIN, Vkt.I.; MIKHAYLENKO, I.Ye.; PELKOVA, O.N.

Effect of the structure of alcohols on their dehydration over
radioactive magnesium sulfate. Zhur. fiz. khim. 39 no.2:478-481
F 1965. (MIRA 18:4)

1. Institut fizicheskoy khimii AN SSSR.

SVIL'KO, M.I., Gerasimov, M.I., B.F., in: *Abstracts of the 1st All-Union Conference on the Chemistry of the Solid State*, 1965, No. 1, p. 105.

"Concentration water" of some heteropoly compounds studied by the method of nuclear magnetic resonance. Dokl. AN SSSR 160 (1964) 105. (MIRA 18:3)

1. Institut fizicheskoy khimii AN SSSR.

L 32473-65 EWT(m)/EPA(s)-2/EPF(c)/T/EWP(j)/EPR/EWA(c) Pc-4/Pr-4/Ps-4/Pt-10

RPL NW/RM

ACCESSION NR: AP5007568

S/0020/65/160/005/1101/1103

AUTHOR: Spitsyn, Vikt. I. (Academician, AN SSSR); Kolli, I. D.; Rodionov, R. A.; Sevast'yanova, T. G.

TITLE: Synthesis and disproportionation reactions of trifluoroborazane derivatives

SOURCE: AN SSSR. Doklady, v. 160, no. 5, 1965, 1101-1103

TOPIC TAGS: borazane, trifluoroborazane, trifluoroborazane derivative, nitrogen substituted derivative, boron nitrogen polymer, synthesis, disproportionation reaction, borazene, difluoroborazene derivative

ABSTRACT: A method was developed for synthesizing and purifying methyl and ethyl derivatives of trifluoroborazane, BF_3NH_3 , and the thermal disproportionation of these derivatives was studied. The organic derivatives of BF_3NH_3 are especially interesting as potential starting materials for preparing thermally stable inorganic polymers with a B-N bond in the main chain. The newly developed method of synthesis was simpler and more reliable than those described in the literature. Trifluoroborazane and its N-methyl and ethyl substituted derivatives were prepared with 82-97% yields by reacting boron trifluoride-diethyl ether in an ethyl ether solution at 5-10°C.

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ACCESSION NR: AP5007568

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with a corresponding alkyl amine. The products were purified by fractional distillation, mostly in a vacuum, without decomposition. Boiling and melting points of the purified compounds were determined. The melting point of BF_3NH_3 was found to be $152-153^\circ\text{C}$, a value which disagreed with data in the literature. On heating, BF_3NH_3 decomposes into ammonium fluoroborate and boron nitride. However, disproportionation of the N-ethyl substituted derivatives of BF_3NH_3 led to N-ethyl substituted difluoroborazenes. This fact indirectly confirmed the assumption that BF_3NH_3 disproportionation occurred in three steps, involving the borazene mechanism, although the intermediate products BF_2NH_2 and $(\text{BFNH})_n$ were not indentified. The disproportionation reaction of N,N-diethyl-B,B-trifluoroborazane, $\text{BF}_3\text{NH}(\text{C}_2\text{H}_5)_2$, at $240-320^\circ\text{C}$, in the presence of certain metals (Al, Mg, Zn,) or without metals, produced N,N-diethyl-B,B-difluoroborazene, $\text{BF}_2\text{N}(\text{C}_2\text{H}_5)_2$, in various yields. Other reaction products were either N-diethylammonium tetrafluoroborate, or hydrogen, or both, depending on conditions. In the presence of sodium, disproportionation yielded diborane, resulting from a break of the B-N bond. Orig. art. has: 3 tables and 5 formulas. [JK]

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University); Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences SSSR)

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L 32473-65

ACCESSION NR: AP5007568

SUBMITTED: 30Sep64

NO REF SOV: 005

ENCL: 00

OTHER: 005

SUB CODE: GC

ATD PRESS: 3204

Card 3/3

L 40727-65 EPF(c)/EWT(m)/EPR/EWP(b)/EWP(t) Pr-4/Ps-4 IJP(c) JD/JG
ACCESSION NR: AP5010581 UR/0020/65/161/003/0594/0596

AUTHOR: Bkhargava, Kh. D.; Kovba, L. M.; Martynenko, L. I.;
Spitsyn, Vikt. I. (Academician)

TITLE: New compounds of rare earths with strontium and barium oxides

SOURCE: AN SSSR. Doklady, v. 161, no. 3, 1965, 594-596

TOPIC TAGS: rare earth, strontium oxide, barium oxide, rare earth
compound, strontium compound, barium compound, phase analysis,
crystal structure

ABSTRACT: A series of compounds of the SrLn_2O_4 or BaLn_2O_4 type have been synthesized by calcining at 1100—1300C compacted mixtures of variable ratios of corresponding oxides or salts. Reactions between strontium oxide and rare earths and between barium oxide and certain rare earths were studied by x-ray phase analysis of the reaction products. Most of the x-ray patterns of the products were obtained with RKD-57 and RKU-86 chambers. The results of phase analysis are shown in Table 1 of the Enclosure. Strontium oxide was shown to form

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L 40727-65

ACCESSION NR: AP5010581

SrLn₂O₄ compounds with all rare earths from neodymium to lutetium, at a rate decreasing with an increase in the ionic radius of the rare earth element. Barium oxide reacted with the rare earths from praseodymium to lutetium, i.e., formed BaLn₂O₄ compounds with the elements having a greater ionic radius than those reacting with the strontium oxide. All synthesized compounds, except BaYb₂O₄, crystallized in the rhombic system with a CaFe₂O₄-type structure. The lattice parameters of all (Sr,Ba)Ln₂O₄ compounds were tabulated. Apparently, BaYb₂O₄ crystallized in the hexagonal system and displayed an ordered arrangement of heavy atoms, forming a superstructure. The reaction between SrO and Sm₂O₃ was singled out because of a significant solubility of SrO in Sm₂O₃ at 1700C, which confirmed the possible existence of an extended homogeneity region (β form) in Sm₂O₃. Formation of the (Sr,Ba)Ln₂O₄ compounds is explained as manifestation of the amphoteric property of the rare earths. All of the compounds, except SrYb₂O₄ were found to be stable at room temperature in the presence of water vapor, moist, or dry CO₂. Orig. art. has: 4 tables. [JK]

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ACCESSION NR: AP5010581

ENCLOSURE: 01

Table 1. Phase analysis data

Composition of the initial mixture	Calcination		Phase Composition	Composition of the initial mixture	Calcination		Phase Composition
	temp.	dur.			temp.	dur.	
SrO - La ₂ O ₃	1100	12	La ₂ O ₃	4SrO - 6Sm ₂ O ₃	1700	0,12	SrSm ₂ O ₆ - Sm ₂ O ₃ (rs. p.)
SrO - Pr ₂ O ₃	1100*	12	Pr ₂ O ₃	3SrO - 7Sm ₂ O ₃	1700	0,12	Sm ₂ O ₃ (rs. p.)
2SrO - Pr ₂ O ₃	1100*	12	Pr ₂ O ₃	2SrO - 8Sm ₂ O ₃	1700	0,12	Sm ₂ O ₃ (")
SrPrO ₄	1100*	12	Pr ₂ O ₃	18SrO - 9Sm ₂ O ₃	1700	0,12	Sm ₂ O ₃ (")
SrO - Nd ₂ O ₃	1100	6	SrNd ₂ O ₆ - Nd ₂ O ₃	SrO - Eu ₂ O ₃	1100	36	SrEu ₂ O ₆
SrO - Nd ₂ O ₃	1100	14	SrNd ₂ O ₆ - Nd ₂ O ₃	SrO - Gd ₂ O ₃	1100	36	SrGd ₂ O ₆
SrO - Nd ₂ O ₃	1100	36	SrNd ₂ O ₆	SrO - Tb ₂ O ₃	1100*	28	SrTb ₂ O ₆
SrO - Nd ₂ O ₃	1300	16	SrNd ₂ O ₆	SrO - Dy ₂ O ₃	1100	36	SrDy ₂ O ₆
9SrO - 1Sm ₂ O ₃	1200	36	SrSm ₂ O ₆ - SrO ** ($\alpha = 5,157 \pm 0,001A$)	SrO - Ho ₂ O ₃	1100	36	SrHo ₂ O ₆
8SrO - 2Sm ₂ O ₃	1200	36	SrSm ₂ O ₆ - SrO	SrO - Er ₂ O ₃	1100	36	SrEr ₂ O ₆
7SrO - 3Sm ₂ O ₃	1200	36	SrSm ₂ O ₆ - SrO	SrO - Tu ₂ O ₃	1100	36	SrTu ₂ O ₆
6SrO - 4Sm ₂ O ₃	1200	36	SrSm ₂ O ₆ - SrO	SrO - Yb ₂ O ₃	1100	36	SrYb ₂ O ₆
5SrO - 5Sm ₂ O ₃	1200	36	SrSm ₂ O ₆	SrO - Lu ₂ O ₃	1100	36	SrLu ₂ O ₆
4SrO - 6Sm ₂ O ₃	1200	36	2 Sm ₂ O ₃ - Sm ₂ O ₃	BaO - La ₂ O ₃	1250	36	La ₂ O ₃ - BaO
3SrO - 8Sm ₂ O ₃	1200	36	SrSm ₂ O ₆ - Sm ₂ O ₃	2BaO - La ₂ O ₃	1250	36	La ₂ O ₃ - BaO
2SrO - 9Sm ₂ O ₃	1200	6	SrSm ₂ O ₆ - Sm ₂ O ₃	BaO - Pr ₂ O ₃	1200*	10	BaPr ₂ O ₆
1SrO - 9Sm ₂ O ₃	1200	6	SrSm ₂ O ₆ - Sm ₂ O ₃	BaPrO ₄	1200*	10	BaPr ₂ O ₆ - Pr ₂ O ₃
78SrO - 2Sm ₂ O ₃	1700	0,12	SrSm ₂ O ₆ - SrO ($\alpha = 5,156 \pm 0,002$)	BaO - CeO ₂	1200*	20	BaCeO ₃ - Ce ₂ O ₃
6SrO - 5Sm ₂ O ₃	1700	0,12	SrSm ₂ O ₆	2BaO - CeO ₂	1200*	20	BaCeO ₃
				BaO - Sm ₂ O ₃	1000	10	BaSm ₂ O ₆
				BaO - Yb ₂ O ₃	1000	10	BaYb ₂ O ₆

* Samples were calcinated in hydrogen stream.

** α of the pure SrO was found to be
5.1588 \pm 0.0005 Å.

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L 40727-65

ACCESSION NR: AP5010581

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomon-
osova (Moscow State University)

SUBMITTED: 10Nov64

ENCL: 01

SUB CODE: 16, GC

NO REF SOV: .003

OTHER: 002

ATD PRESS: 3231

Card 3/4

GRIGOR'YAN, V. I., *Uchenye Zapiski Kazanskogo Universiteta*, 1965, 57, 1, 1-11.
Sibirsk. v. 121, 1, 1965.

Study of neutral imino diacetates of certain metals by infrared spectroscopy. Dokl. AN SSSR 161 no. 342-342 Apr 1965. (MIRA 18:5)

1. Moskovskiy gosudarstvennyy universitet.

L 45610-65 EPF(n)-2/EWA(c)/EWT(m)/EWP(b)/T/EWP(t) Pu-4 IJP(c) JD/JG

UR/0020/65/161/006/1359/1361

ACCESSION NR: AP5012768

AUTHOR: Sevost'yanova, N. I.; Murav'yeva, I. A.; Kovba, L. M.; Martynenko, L. I.; Spitsyn, Vikt. I. (Academician)

TITLE: New compounds of the rare earths with lithium

SOURCE: AN SSSR. Doklady, v. 161, no. 6, 1965, 1359-1361

TOPIC TAGS: rare earth compound, lithium compound, lithium terbate, lithium praseodymate, lithium lanthanate, lithium ytterbate

ABSTRACT: Two new and two known compounds of rare earths with lithium oxide have been prepared and analyzed by x-rays to supplement study of the amphoteric character of the rare earths. The new compounds were prepared by calcining at 500-800C compacted mixtures of Pr_2O_3 or Tb_2O_3 and lithium carbonate. As x-ray powder patterns of the products were similar to the previously described patterns of LiNdO_2 or LiGdO_2 , it was possible to assign the new compounds the formula LiPrO_2 or LiTbO_2 . Lithium terbate (LiTbO_2) crystallized in the rhombic system with lattice constants: $a = 5.27 \text{ \AA}$, $b = 11.16 \text{ \AA}$, and $c = 3.41 \text{ \AA}$. The crystal structure of LiPrO_2 is different but could not be determined from its x-ray pattern. The known compounds LiLaO_2 and LiYbO_2 were prepared by calcining mixtures of the nitrates of

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L 45610-65

ACCESSION NR: AP5012768

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corresponding rare earth elements with lithium nitrate. LiLaO_2 , in disagreement with the earlier data, crystallized in the rhombic system and had a distorted cubic unit cell. The lattice parameters of LiLaO_2 were determined. The earlier reported crystal structure of LiYbO_2 was confirmed. Orig. art. has: 3 tables. [JK]

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 07Dec64

ENCL: 00

SUB CODE: GC, IC

NO REF SOV: 000

OTHER: 006

ATD PRESS: 4001

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212778

1. The compound is a white crystalline solid, mp 110-111°C.

It is taken pure in a magnesium sulfate catalyst during its use.
Yield: 1.53% (1.52 g) of 1.56-1.58 g. (1.65% yield) (MIR 18:7)

1. Institut fizicheskoy khimii AN SSSR.

SLIPYIN, I.M.; Kabanov, V.Ya.; BAKHCHISARAYTSEVA, S.A.; Kabanov, V.Ya.

Basicity of some heteropoly compounds studied by infrared ~~spectroscopy~~.
Dokl. AN SSSR 163 no.4:913-916 Ag '65.

(MIRA 18:8)

1. Institut fizicheskoy khimii AN SSSR.

SPITSEN. Tsentral. akademi: ARAPSELIAN, V.S.

Diffusion coefficients determined by the adsorption method from the average displacement. Dokl. AN SSSR 164 no.4:864-867 O '65. (MIRA 18:10)

1. Institut fizicheskoy khimii AN SSSR.

SPITSYN, G.K., akademiya MIKHELYA, N.B.; KHARMAN, A.; MALININ, A.B.

Possibility of equilibrium disturbance in a heterogeneous system
containing a microcomponent due to solid phase recrystallization.
Dokl. AN SSSR 195 no.2:147-148 N 165.

(MIRA 18:10)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.